Remarks/Arguments:

Claims 1, 3, 5-9, 11-12, and 17-18 are pending in the above-identified application. By this Amendment, claims 1, 3, 5-9, 11-12, and 17 are amended and claims 2, 4, and 10 are canceled.

Amendments to the Specification

Paragraph **[0036]** of the specification has been amended to correct errors in the descriptions of the resolution settings. Basis for the amendments may be found in paragraph **[0004]** of the background section and in paragraph **[0036]** of the written description. No new matter has been added.

Rejections under 35 U.S.C. §112

Claims 4-6, 10-12, 17, and 18 were rejected under 35 U.S.C. §112 for including terms which the Office Action asserts render the claims indefinite. Specifically, the Office Action contends that the terms "lowest setting," "intermediate setting," and "highest setting" are relative and are not defined by the claim.

This ground for rejection is overcome by the amendments to claims 1, 7, and 17. Claim 1 is amended to include the recitation that the method uses "an alignment apparatus having a plurality of scan resolutions comprising lowest, intermediate, and highest settings." Claims 7 and 17 are amended to include similar recitations. Applicant respectfully contends that, as amended, claims 1, 7, and 17 are not indefinite.

MPEP §2173.05(b) states that the "fact that claim language, including terms of degree, may not be precise, does not automatically render the claim indefinite under 35 U.S.C. 112, second paragraph." The MPEP further states:

> When a term of degree is presented in a claim, first a determination is to be made as to whether the specification provides some standard for measuring that degree. If it does not, a determination is made as to whether one of ordinary skill in the art, in view of the prior art and the status of the art, would be nevertheless reasonably apprised of the scope of the invention.

See id.

Applicant respectfully contends that the specification provides the standard for measuring the degree of the terms "lowest setting," "intermediate setting," and "highest setting." The specification describes resolution settings at paragraph **[0030]**:

> The current resolution setting may take on a lowest value, a highest value, and one or more intermediate values. A setting of the current resolution, therefore, designates the respective distances of vertex data points from the center data point, whereby higher resolution values designate vertex data points at distances closer to the center data point.

From this paragraph, one skilled in the art may readily comprehend what the claim terms "highest setting," "intermediate setting," and "lowest setting" mean in relation to the resolution setting. Therefore, Applicant respectfully requests favorable reconsideration.

Rejections under 35 U.S.C. §102

Claim 1 was rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,690,865 to Miyazaki. This ground for rejection is overcome by the amendments to claim 1. In particular, Miyazaki does not disclose or suggest:

> i) setting the scan resolution to a higher setting if the new alignment data point is at the same location as the alignment data point and if the current setting of the scan resolution is not at the highest setting after step h; and
>
> j) repeating steps d-i, wherein the at least three perimeter data points are disposed around the new alignment data point[,]

as required by claim 1.

Miyazaki concerns a method for aligning a laser diode and an optical fiber using an alignment apparatus. FIG. 1 illustrates an alignment apparatus which includes a placement part 9 for a laser diode chip 3, a ferrule gripping part for gripping a ferrule 4 of a fiber 8, and an optical fiber moving stage 11 for aligning laser diode chip 3 and fiber 8. (See col. 4, line 58 - col. 5, line 45). Stage control part 7 controls the movement of moving stage 11 according to an algorithm for aligning the laser diode 3 and the optical fiber 8. (See col. 5, lines 39-46). The algorithm generally performs the steps of first aligning fiber 8 along the optical axis direction (the Z-axis direction). (See col. 5, line 52 - col. 6, line 15; FIG. 1). After alignment in the Z-axis direction, the algorithm then performs rough alignment in the XY plane (See col. 6, line 16 - col. 7, line 12) and then microalignment in the XY plane (See col. 7, lines 13-34). The XY plane is the plane parallel to the face of fiber 8. (See FIG. 1).

The steps of aligning fiber 8 and laser diode 3 in the XY plane are more particularly detailed in FIGS. 6-8 and accompanying text. When beginning rough alignment in the XY plane, the algorithm scans laser light received by fiber 8 from the laser diode chip 3 at a

plurality of points, starting with a predetermined reference position. (See col. 8, lines 23-29). The plurality of points form a whirl pattern, such as the one illustrated in FIG. 3B (See col. 8, lines 23-29), and the distance between these points is set in both the X- and Y- axis directions (See col. 8, lines 39-51).

After scanning all of the points in the whirl pattern, the point with the highest detected light power is designated as the rough alignment position and becomes the new starting point, and the scanning along the whirl pattern is repeated referenced from this new starting point. (See col. 8, lines 29-38). The step size (scan resolution) is the same for both of these whirl patters. As shown in FIG. 6, the whirl pattern is repeated up to 20 times or until the sampled light power exceeds 1 mW. (See FIG. 6, step 102). At that time, rough alignment is again repeated up to 20 times or until the sampled light power exceeds 6 mW. (See col. 8, lines 47-51; FIG. 6, step 104).

After rough alignment is completed, microalignment is performed. During microalignment, the method changes the scan pattern from the whirl-shaped pattern to the five-pointed pattern illustrated in FIG. 4. (See col. 9, lines 6-16). This five-pointed pattern contains fewer points than the whirl-shaped pattern (Compare FIG. 4 to FIGS. 3A-3C), and the points are closer to one another than the points in the whirl-shaped pattern (See col. 9, lines 21-30). The initial reference position of the five-pointed pattern is the final reference position achieved by the rough alignment. (See col. 9, lines 9-11). This five-pointed pattern is not repeated. Instead, it is used in a simplex algorithm to identify a gradient which points to additional points. (See Figs. 10 and 11).

Miyazaki does not disclose or suggest "setting the scan resolution to a higher setting **if the new alignment data point is at the same location as the alignment data point** and if the current setting of the scan resolution is not at a highest setting . . .," as required in claim 1. (emphasis added). The only time Miyazaki discloses changing the distance between points in a scan is during the transition between rough alignment and microalignment. This transition is made when the sampled light power exceeds 1 mW at the rough alignment position, not when the new reference position is the same as the old reference position.

Additionally, Miyazaki does not disclose or suggest "**repeating steps d-i, wherein the at least three perimeter data points** are disposed around the new alignment data point," as required by claim 1. (emphasis added). Specifically, in Miyazaki, the micro-alignment scan resolution is not changed.

The Office Action cites to col. 12, lines 56-60, and col. 14, lines 1-35, as disclosing the claim features of "determining a greatest measure of alignment quality." (See Office Action,

page 3, Item 5). These passages describe alignment along the Z-axis of fiber 8 and not in the XY plane and are not pertinent to claims 1, 3, 5-9, 11-12, and 17-18.

The subject invention represents an advantage over the system described in Miyazaki because the subject invention provides a way of quickly increasing the scan resolution in an early stage of scanning. Miyazaki, however, does not alter the scanning pattern until after two cycles of rough XY alignments (each containing 20 repetitions) have been completed. Because Miyazaki does not disclose or suggest all of the limitations of claim 1, claim 1 is not subject to rejection under 35 U.S.C. §102(b) in view of Miyazaki.

Claims 3, 5, and 6 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,690,865 to Miyazaki. Because Miyazaki does not disclose all of the limitations of claim 1 as amended, claims 3, 5, and 6 which depend from claim 1 are not subject to rejection under 35 U.S.C. §102(b) in view of Miyazaki.

Claims 7-9, 11, and 12 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 6,690,865 to Miyazaki. By this Amendment, claim 7 is amended to include features similar to those in claim 1. Because Miyazaki does not disclose all of the limitations of claim 1 as discussed above, claim 7 and claims 8, 9, 11, and 12 which depend from claim 7 are not subject to rejection under 35 U.S.C. §102(b) in view of Miyazaki.

Rejection of claim 17 under 35 U.S.C. §102(b)

Claim 17 was rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,690,865 to Miyazaki. This ground for rejection is respectfully traversed. In particular, Miyazaki does not disclose or suggest:

> h) setting the scan resolution to a higher setting if the new current alignment point is at the same location as the current alignment point and if the current setting of scan resolution is not at the highest setting;
>
> . . .
>
> k) repeating steps d-k, where n the four vertex alignment points are disposed around the new current alignment point until the greatest measure of alignment quality is greater than a predetermined value[,]

as required by claim 17, as amended to address the §112 rejections.

Steps h and k of claim 17 are similar to steps i and j of claim 1. As described above, Miyazaki does not disclose or suggest steps i and j of claim 1. Accordingly, claim 17 and claim

18 which depends from claim 17 are not subject to rejection under 35 U.S.C. §102(b) in view of Miyazaki.

Claim 17 includes an additional step that is not disclosed or suggest by Miyazaki, namely:

> j) setting the scan resolution to the lowest setting if the current setting of scan resolution is at the highest setting and if alignment quality at the current alignment point is below a lowest threshold . . . .

As described above, Miyazaki discloses that at the points scanned during microalignment are closer together than the points scanned during rough alignment. Thus, when making the transition from rough alignment to microalignment, the resolution of the scan is increased. At no time, however, is the resolution in Miyazaki ever decreased. Because Miyazaki does not disclose all of the limitations of claim 17, claim 17 and claim 18 which depends from claim 17 are not subject to rejection under 35 U.S.C. §102(b) in view of Miyazaki.

Conclusion

In view of the foregoing amendments and remarks, Applicant requests that the Examiner reconsider and withdraw the rejection of claims 1., 3, 5-9, 11-12, and 17-18.

Respectfully submitted,

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Dated: May 15, 2006

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